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FAMILY LYCEUM.

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THE ANCIENTS.

From Platt's Universal Biography.

PYTHAGORAS.

PYTHAGORAS, one of the greatest philosophers of antiquity, was born about the forty-seventh Olympiad, or 590 years before Christ. His father's principal residence was at Samos; but being a travelling merchant, his son Pythagoras was born at Sidon, in Syria; but soon returning home, our philosopher was brought up at Samos, where he was educated in a manner that was answerable to the great hopes that were conceived of him. He was called 'the youth with a fine head of hair'; and from the great qualities that soon appeared in him, he was regarded as a good genius sent into the world for the benefit of mankind.

Samos, however, afforded no philosophers capable of satisfying his thirst for knowledge; and therefore he left his parents, and resolved to travel in quest of wisdom. The fame of Pherecydes drew him first to the island of Scyros, from hence he went to Miletus, where he conversed with Thales. He then travelled to Phœnicia, and stayed some time at Sidon, the place of his birth; and from hence he passed into Egypt, where Thales and Solon had been before him.

Having spent twenty-five years in Egypt, to acquire all the learning and knowledge he could procure in that country, with the same view he travelled to Chaldea, and visited Babylon. Returning after some time, he went to Crete; and from hence to Sparta, to be instructed in the laws of Minos and Lycurgus. He then returned to Samos; which, finding under the tyranny of Polycrates, he quitted again, and visited the several countries of Greece. Passing through Peloponnesus, he stopped at Pholius, where Leo then reigned; and in his conversation with that prince, he spoke with so much eloquence and wisdom, that Leo was at once delighted and surprised.

From Peloponnesus he went into Italy, and passed some time at Heraclea and Tarentum; but made his chief residence at Croton, where, after reforming the manners of the citizens by lecturing, and establishing the city by wise and prudent counsels, he opened a school, to display the treasures of wisdom and learning he possessed. It is not to be wondered that he was soon attended by a crowd of disciples, who repaired to him from different parts of Greece and Italy.

He gave his scholars the rules of the Egyptian priests, and made them pass through the austerities which he himself had endured.—He at first enjoined them a five years' silence in the school, during which they were only to hear; after which, leave was given them to start questions, and to propose doubts, under the caution, however, to say 'not a little in many words, but much in a few.' Having gone through their probation, they were obliged, before they were admitted, to bring all their fortune into the common stock, which was managed by persons chosen on purpose, and called economists, and the whole community had all things in common.

The necessity of concealing their mysteries, induced the Egyptians to make use of three sorts of styles, or ways of expressing their thoughts; the simple, the hieroglyphical, and the symbolical. In the simple, they spoke plainly and intelligibly, as in common conversation; in the hieroglyphical, they concealed their thoughts under certain images and characters; and in the symbolical, they explained them by short expressions, which, under a sense plain and simple, included another wholly figurative. Pythagoras borrowed these three different ways from the Egpytians in all the instructions he gave; but chiefly imitated the symbolical style, which he thought very proper to inculcate the greatest and most important truths; for a symbol, by its double sense, the proper and the figurative, teaches two things at once; and nothing pleases the mind more than the double image it represents to our view. In this manner Pythagoras delivered many excellent things concerning God and the human soul, and a great variety of precepts, relating to the conduct of life, political as well as civil; he made also some considerable discoveries and advances in the arts and sciences. Thus, among the works ascribed to him, there are not only books of physic and morality, like that contained in what are called his 'Golden Verses', but treatises on politics and theology. All these works are lost; but the greatness of his mind appears from the wonderful things he performed. He delivered, as antiquity relates, several cities of Italy and Sicily from the yoke of slavery; he appeased seditions in others; and he softened the manners, and brought to temper the most savage and unruly spirits of several people and tyrants.—Phalaris, the tyrant of Sicily, it is said, was the only one who could withstand the remonstrances of Pythagoras; and he it seems was so enraged at his discourses, that he ordered him to be put to death. But though the lectures of the philosopher could make no impression on the tyrant, yet they were sufficient to reanimate the Sicilians, and to put them upon a bold action. In short, Phalaris was killed the same day that he had fixed for the death of the philosopher.

Pythagoras had a great veneration for marriage, and therefore himself married at Crotona a daughter of one of the chief men of that city, by whom he had two sons and a daughter. One of these sons succeeded his father in the school, and became the master of Empedocles. The daughter, named Damo, was distinguished both by her learning and her virtues, and wrote an excellent commentary upon Homer. It is related that Pythagoras had given her some of his writings, with express commands not to impart them to any but those of his own family; to which Damo was so scrupulously obedient, that even when she was reduced to extreme poverty, she refused a great sum of money for them.

From the country in which Pythagoras thus settled and gave his instructions, his society of disciples was called the Italic sect of philosophers, and their reputation continued for some ages afterwards, when the Academy and the Lyceum united to obscure and swallow up the Italic sect.

Pythagoras's disciples regarded the words of their master as the oracles of a god; his authority alone, though unsupported by reason, passed with them for reason itself; they looked upon him as the most perfect image of God among men. His house was called the temple of Ceres; and his court-yard the temple of the Muses; and when he went into towns, it was said he went thither, 'not to teach men, but to heal them.' Pythagoras was persecuted by bad men in the last years of his life, and some say he was killed in a tumult raised by them against him; but according to others, he died a natural death at ninety years of age, about 500 years before Christ.

Beside the high respect and veneration the world has always had for Pythagoras, on account of the excellence of his wisdom, his morality, his theology, and politics, he was pronounced as learned in all the sciences, and a considerable inventor of many things in them; as arithmetic, geometry, astronomy, music, &c. In arithmetic, the common multiplication-table is, to this day, still called Pythagoras's table. It is to him that the world is indebted for the demonstration of the forty-seventh proposition of the first book of Euclid's Elements, about the square of the hypothenuse. It is said, that he was so elated after making the discovery, that he made an offering of a hecatomb to the gods; but the sacrifice was undoubtedly of small oxen, made of wax, as the philosopher was ever an enemy to shedding the blood of animals of any description. In astronomy, his inventions were many and great. It is reported that he discovered or maintained the true system of the world, which places the sun in the centre; and made all the planets revolve about him; from him it is to this day called the Pythagorean system, and is the same as that afterwards revived by Copernicus. He first discovered that Lucifer and Hesperus were but one and the same, being the planet Venus, though formerly thought to be two different stars. The invention of the obliquity of the Zodiac is likewise ascribed to him. He first gave to the world the name of Kosmos, from the order and beauty of all things comprehended in it; asserting that it was made according to musical proportion, for as he held that the sun, by him and his followers termed the fiery globe of unity, was seated in the midst of the universe, and the earth and planets moving around him, so he held that the seven planets had an harmonious motion, and their distances from the sun corresponded to the musical intervals or divisions of the monochord.

Pythagoras and his followers held the transmigration of souls, making them successively occupy one body after another; on which account they abstained from flesh, and lived chiefly on vegetables.

From Mrs. Grahame's Journey to Juggernaut.

TEMPLE OF ELEPHANTA.

WE got into our boat at Mazagong a little before sunrise, and had the pleasure of marking the gradual increase of day, as it broke over the Mahratta mountains. First, the woody tops of Caranja and Elephanta became illuminated; then Bombay, with its forts and villages stretching along the north of the bay, while the bases of the rocky islands to the south slowly became distinguishable from the reflecting waves. After an hour's row, during which we passed Butcher's Island, called by the natives Dava Devi, or holy island, we arrived at Elephanta, a mountain isle with a double top wooded to the summit. Opposite to the landing-place is the colossal stone elephant, from which the Portuguese named the place. It is now cracked and mutilated, as tradition says, by the Portuguese. It must have been carved out of the rock on which it stands, for it appears too large to have been carried to its present situation. After passing a village, which, as well as the whole island, the natives call Gharipoori, we ascended the hill through romantic passes, sometimes overshadowed with wood, sometimes walled by rocks, till we arrived at the cave. We came upon it unexpectedly, and I confess that I never felt such a sensation of astonishment as when the cavern opened upon me. At first it appeared all darkness, while on the hill above, below, and around, shrubs and flowers of the most brilliant hues were waving in the full sunshine. As I entered, my sight became gradually more distinct, and I was able to consider the wonderful chamber in which I stood. The entrance is fifty-five feet wide, its height is eighteen, and its length about equal to its width. It is supported by massy pillars, caved in the solid rock; the capital of these resembles a compressed cushion bound with a fillet; the abacus is like a bunch of reeds supporting a beam, six of which run across the whole cave; below the capital the column may be compared to a fluted bell resting on a plain octagonal member placed on a die, on each corner of which sits Hanuman, Ganesa, or some of the other inferior gods. The sides of the cavern are sculptured in compartments, representing persons of the mythology; but the end of the cavern opposite to the entrance is the most remarkable. In the centre is a gigantic trimurti, or three-formed god. Brahma, the creator, is in the middle, with a placid countenance; his cap is adorned with jewels. Vishnu, the preserving deity, is represented as very beautiful; his face is full of benevolence, his hand holds a lotus, the same sacred flower is placed in his cap, with the triveni or triple-plaited lock, signifying the rivers Gunga (Ganges,) Yamuna (Jumna,) and Seraswati, and other ornaments referring to his attributes. Siva frowns; his nose is aquiline, and his mouth half-open; in his hand is his destructive emblem, the cobra capella, and on his cap, among other symbols, a human skull and a new-born infant mark his double character of destroyer and reproducer. These faces are all beautiful but for the under lips, which are remarkably thick. The length from the chin to the crown of the head is six feet; the caps are about three feet more. No part of the bust is mutilated but the two hands in front, which are quite destroyed. Concealed steps behind Siva's hand lead to a convenient ledge or bench behind the cap of the bust, where a Bramin might have hidden himself for any purpose of priestly imposition. On each side of the trimurti is a pilaster, the front of which is filled up by a figure fourteen feet high, leaning on a dwarf; these are much defaced. To the right is a large square compartment, hollowed a little, carved into a great variety of figures, the largest of which is sixteen feet high, representing the double figure of Siva and Parvati, called Viraj or Ardha Nari, half male half female, the right side of which is Siva, and the left his wife: it is four-handed; the two lower hands, one of which appears to have rested on the Nundi, are broken; the upper right-hand has a cobra-capella, and the left a shield. On the right of the Viraj is Brama, four-faced, sitting on a lotus; and on the left is Vishnu, on the shoulders of Garuda. Near Brahma are Indra and Indranee, on their elephant, and below is a female figure holding a chamara or chowree.* The upper part of the compartment is filled with small figures in the attitudes of adoration.

On the other side of the trimurti is a compartment answering to that I have just described. The principal figure I take to be Siva; at his left stands Parvati, on whose shoulder he leans; between them is a dwarf, on whose head is one of Siva's hands, and near Parvati is another. Over Siva's shoulder hangs the zenaar, and he holds the cobra-capella in one of his four hands. He is surrounded by the same figures which fill up the compartment of the Veraji; his own height, (which we measured by a plumb-line dropped from his head,) is fourteen feet, and that of Parvati is ten. All these figures are in alto-relievo, as are those of the other sides of the cavern, the most remarkable of which is one of Siva in his vindictive character; he is eight-handed, with a chaplet of skulls round his neck, and appears in the act of performing the human sacrifice.

On the right-hand, as you enter the cave, is a square apartment with four doors, supported by eight colossal figures; it contains a gigantic symbol of Maha Deo, and is cut out of the rock like the rest of the cave. There is a similar chamber in a smaller and more secret cavern, to which there is access from the corner next to the Viraji; the covering of the passage has fallen in, but on climbing over the rubbish, we found ourselves in a little area which has no outlet, and is lighted from above, the whole thickness of the hill being cut through. The cavern to which it belongs contains nothing but the square chamber of Maha Deo, and a bath at each end, one of which is decorated with rich sculpture.

When we had tired ourselves with examining the various wonders of the cavern of Elephanta, I sat down to take a sketch of the great compartments opposite to the entrance, and on our return to Bombay, comparing the drawing with those in Niebuhr, we were satisfied that its resemblance to the original is the most correct. I am sorry to observe, that the pillars and sculptures of the cave are defaced in every part, by having the names of most who visit them, either carved or daubed with black chalk upon them; and the intemperate zeal of the Portuguese, who made war upon the gods and temples, as well as upon the armies of India, added to the havoc of time, has reduced this stupendous monument of idolatry to a state of ruin. Fragments of statues strew the floor; columns, deprived of their bases, are suspended from the parent roof, and others without capitals, and sometimes split in two, threaten to leave the massy hill that covers them without support.

The temple of Elephanta, and other equally wonderful caverns in the neighborhood, must have been the works of a people far advanced in the works of civilized life, and possessed of wealth and power; but these were lodged in the hands of a crafty priesthood, who kept science, affluence, and honour, for their own fraternity, and, possessed of better ideas, preached a miserable and degrading superstition to the multitude. It would be curious to follow out the advancement and fall of the arts which produced such monuments; but not a trace of their history remains, and we are left to seek it in the natural progress of a people subtle and ingenious, but depressed by superstition, and the utter impossibility of rising individually, by any virtues or any talents, to a higher rank in society than that occupied by their forefathers.

* The chamara is a whisk to keep off flies, made either of a cow's tail or peacock's feathers, or ivory shavings, set in a handle two feet long. They are always carried behind persons of rank.

From Arnott's Physics.

DIVISIBILITY OF MATTER.

THE following are interesting particulars in the arts or in nature, helping the mind to conceive how minute the ultimate atoms of matter must be.

Goldbeaters, by hammering, reduce gold to leaves so thin, that 282,000 must be laid upon each other to produce the thickness of an inch. They are so thin, that if formed into a book, 1,500 would occupy only the space of a single leaf of common paper; and an octavo volume of an inch thick would have about as many pages as the books of a well-stocked ordinary library containing 1,500 volumes of 400 pages in each; yet these leaves are perfect, or without holes,

so that one of them laid upon any surface, as in gilding, gives the appearance of solid gold.

Still thinner than this is the coating of gold, upon the silver wire of what is called gold lace, and we are not sure that such coating is of only one atom thick.

Platinum and silver can be drawn into wire much finer than human hair.

A grain of blue vitriol, or carmine, will tinge a gallon of water, so that in every drop the color may be perceived.

A grain of musk will scent a room for twenty years, and will have lost but little of its weight.

The carrion crow smells its food at a distance of many miles.

The thread of the silk-worm is so small, that many folds are twisted together to form our finest sewing-thread; but that of the spider is smaller still, for two drachms of it by weight, would reach from London to Edinburgh, or 400 miles.

In the milt of a cod-fish, or in water in which certain vegetables have been infused, the microscope discovers animalcules, of which many thousands together do not equal in bulk a grain of sand: yet, these have their blood and other subordinate parts like larger animals; and indeed nature, with a singular prodigality, has supplied many of them with organs as complex as those of the whale or elephant. Now the body of an animalcule consists of the same substances, or ultimate atoms, as the body of man himself. In a single pound of matter, it thus appears, there may be more living creatures than of human beings on the face of this globe. What a scene has the microscope laid open to the admiration of the philosophic inquirer!

Water, mercury, sulphur, or, in general, any substance, when sufficiently heated, rises as invisible vapor or gas; in other words, is made to assume the aeriform state. Great heat, therefore, would cause the whole of the material universe to disappear, the most solid bodies becoming as invisible and impalpable as the air we breathe. Utter annihilation would seem but one stage beyond this.

The Human Hand.

The human hand is so admirable, from its numerous mechanical and sensitive capabilities, that an opinion at one time commonly prevailed, that man's superior reason depended on his possessing such an instructer and such a servant. Now although reason, with hoofs instead of fingers, could never have raised man much above the brutes, and probably could not have secured the continued existence of the species, still the hand is no more than a fit instrument of the god-like mind which directs it.

The Knee.

The knee is a hinge joint of complicated structure, and it claims the most attentive study of the surgeon. The rubbing parts are flat and shallow, and therefore the joint has little strength from form; but it derives security from the numerous and singularly strong ligaments which surround it. The ligaments on the inside of the knees resemble, in two circumstances, the annular ligaments of joints, viz.: in having a constant and great strain to bear, and yet in becoming stronger always as the strain increases. The line of the leg, even in the most perfect shapes, bends inwards a little at the knee, requiring the support of ligaments; and in many persons it bends very much; but the inclination does not increase with age. The legs of many weakly in-kneed children become straight by exercise alone. This inclination at the middle joint of the leg, by throwing a certain strain on the ligaments, gives an increase of elasticity to the limb, in the actions of jumping, running, &c.

In the knee there is a singular provision of loose cartilages, which have been called friction cartilages, from a supposed relation in use to friction wheels; but their real effect seems to be to accommodate in the different positions of the joint, the surfaces of the rubbing bones to each other.

Under the head of *Pneumatics*, we shall find that the bones forming the knee are held together, independently of the ligaments, by a constant pressure of the atmosphere, amounting to upwards of sixty pounds.

The great muscles on the forepart of the thigh are contracted into a tendon a little above the knee, and have to pass over and in front of the knee to reach the top of the leg, where their attachment is. The tendon, in passing over the joint, becomes bony, and forms the patella or knee-pan, often called the pulley of the knee. This peculiarity enables the muscles to act more advantageously, by increasing the distance of the rope from the centre of motion. The patella is moreover a sort of shield or protection to the forepart of this important joint.

The leg below the knee, like the fore-arm, has two bones. They offer spacious surface of origin for the numerous muscles required for the feet, and they form a compound pillar of greater strength than the same quantity of bone as one shaft would have had. The individual bones also are angular instead of round, hence deriving greater power to resist blows, &c.

From Ure's Chemical Dictionary.

Liquorice.

In treating the root of the *Glycirrhiza glabra* with water, a solution is formed, which, properly evaporated, produces the sweet-tasted substance usually called extract or juice of liquorice. From M. Robiquet's experiments it appears that this root is composed of starchy fecula, vegetable albumen, a saccharine matter approaching to the resins, phosphoric and malic acids combined with magnesia, a brown, resinous, thick, and acrid oil, a chrystalline matter having a saline aspect, and finally a ligneous tissue.—Of these substances, we shall here consider only that which has a saccharine taste, and that susceptible of chrystallization.

The sweetish substance is unchrystallizable; of a dirty yellow color, and a taste like that of liquorice. Cold water hardly dissolves it, but it is soluble in alcohol, cold or hot. This substance may be procured, by boiling water on liquorice root for about a quarter of an hour, filtering the solution, and adding to it, after it is perfectly cool, a little distilled vinegar. The resulting gelatinous magma being washed and dried, to be digested in alcohol, which takes up only the sugary substance.

The chrystallizable matter is obtained by pouring into the supernatant liquid of the above magma, solution of acetate of lead till it be deprived of color; then filtering the liquid, transmitting sulphuretted hydrogen gas through it, filtering afresh, and concentrating by evaporation: this passes through, and then leaves it undisturbed. Very regular chrystals form in it, which at first are dirty, but may be purified by a second chrystallization, when they become transparent rectangular octohedrons. They have hardly any taste; on burning coals they intumesce, diffusing an ammoniacal odour; triturated with potash, they evolve ammonia after some time; they are very slightly soluble in water, affording a solution which is not affected by any ordinary test.

From Mitchell's Encyclopedia.

Natural History.

The object of this branch of science may be divided into two heads; the first teaches us the characteristics, or distinctive marks of each individual object, whether animal, vegetable, or mineral; the second makes us acquainted with all its peculiarities, as to its habits, its qualities, and its uses. To assist in attaining the first, it is necessary to adopt some system of classification, in which individuals that agree in particular points may be arranged together. In this work we have adopted the Linnæan system, as the most simple and perfect that has been presented to the public. A knowledge of the second head is only gained by a patient investigation of each particular object. The study of natural history consists in the collection, arrangement, and exhibition of the various productions of the earth. These are divided into the three grand kingdoms of nature, the boundaries of which meet together in the zoophytes. Minerals inhabit the interior parts of the earth in rude and shapeless masses. They are bodies concrete without life and sensation. Vegetables clothe the surface with verdure, imbibe nourishment through bibulous roots, breathe by leaves, and continue their kind by the dispersion of seed within prescribed limits. They are organized bodies, and have life but not sensation. Animals adorn the exterior parts of the earth, respire and generate eggs; are impelled to action by hunger, affections and pain: and by preying on other animals and vegetables, restrain within proper bounds and proportions the numbers of both. They have organized bodies, and have life, sensation, and the power of locomotion. Man, the governor and subjugator of all other beings, is, by his wisdom alone, able to form just conclusions from such things as present themselves to his senses, which consist of natural bodies. Hence the first step of wisdom is to know these bodies, and to be able, by marks imprinted on them by the God of nature, to distinguish them from each other, and to affix to every object its proper name. The Linnæan system is divided into five branches, each subordinate to the other; these are, class, order, genus, species, and variety, with their names and characters. In this arrangement, the classes and orders are arbitrary, the genera and species are natural. Of the three grand divisons above referred to, the animal kingdom ranks highest in comparative estimation; next the vegetable, and last the mineral kingdom.

Animals enjoy sensation by means of a living organization, animated by a meddullary substance: perception by nerves; and motion by the exertion of the will. They have members for the different purposes of life; organs for their different senses; and faculties or powers for the application of their different perceptions. They all originate from an egg. Their external and internal structure, habits, instincts, and various relations to each other, will be found under the different genera.

The following is a brief abstract of the arrangement pursued by Linnæus in his division of the animal kingdom.

Class 1. *Mammalia.*

ORDER.

Primates	Pecora
Bruta	Belluæ
Feræ	Cete
Glires	

Class 2. *Aves.*

ORDER.

Accipetres	Grallæ
Picæ	Gallinæ
Anseres	Passeres

Class 3. *Amphibia.*

ORDER.

Reptilia	Serpentes

Class 4. *Pisces.*

ORDER.

Apodes	Abdominales
Jugulares	Brancheostegi
Thoracici	Condropterygii

Class 5. *Insecta.*

ORDER.

Coleoptera	Hymenoptera
Hemyptera	Diptera
Lepidoptera	Aptera
Neuroptera	

Class 6. *Vermes.*

ORDER.

Intestina	Zoophyta
Mollusca	Infusoria
Tetascea	

APPARATUS.

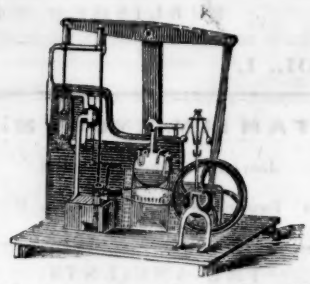
PUMPS.

The various articles of apparatus made by Timothy Claxton, now of Boston, formerly of London, are among the most useful instruments for illustrating the practical sciences, which have been made either in Europe or America. By an air pump, in a great measure original with him, which is afforded, with all its appendages, for thirty-seven dollars, more and better experiments can be performed than by some which have been brought from London at an expense of two or three hundred dollars. This instrument, with all its appurtenances, is so compact, and the experiments performed with so much ease, as to fit it in a particular manner for schools, lyceums, and smaller social circles. It would be an excellent piece of furniture in every family. And in most families, money, to a greater amount than the expense of this useful and amusing instrument, is expended every year for less important articles, whether instruction or entertainment is considered.

Besides air pumps, Mr. C. furnishes models of water pumps, which make the operations of these useful instruments perfectly plain to the most uninstructed mind.

This cut represents two kinds of pumps, one acting by atmospheric pressure, the weight of the air on the water without raising it into the pump as that within is drawn off by the piston. The other is called the forcing pump, and by the chamber of air furnished by the flask attached to it, the principle of the fire engine is illustrated.

Models of steam engines are also made by Mr. Claxton, to illustrate in a most satisfactory manner this wonder-working instrument, in the commercial and manufacturing world. An imperfect idea of the principles of this engine may be formed by the illustration here presented in the drawing, though to understand it fully, a working model is far preferable.



All the apparatus made by Mr. Claxton can be depended upon as answering well the purpose for which it was designed. For no man in this country is probably more familiar with the principles of science, which these instruments are intended to illustrate, than this truly scientific and practical mechanic. And it may be added that his liberality and patriotism is equal to his intelligence and ingenuity.

GEOLOGY.

LIME.

A gentleman of this city showed us, a few days since, a table which he had just received from Italy, composed of one hundred and eighty different kinds of stone. Besides marble, of which most of them were composed, there were several specimens of porphyry and amygdoid. The whole was beautifully polished, and laid into squares and oblongs by Irish marble, which is a jet black, separating the other kinds.

All the varieties of marble, which are probably not much less than two hundred, are lime, and composed of the same ingredients as chalk, and of those rocks which are commonly known by the name of limestone.

All the varieties of limestone as it is found in nature under that name, are in chemical language the carbonate of lime, being composed of carbonic acid and lime. The carbonic acid is composed of carbon, a combustible substance, and oxigen, the common supporter of combustion, both simple elements

Lime, when deprived of its carbonic acid, is composed of silicum, a peculiar metal, and oxigen; and is of course an oxid of silicum. Limestone, then, under all its variations as it is found in nature, whether in the finest marbles, the common lime-rock, in chalk, or any other form, is composed of silicum, carbon, and oxigen; the last existing in two combinations, being combined both with the metal and that combustible, carbon, which constitutes a great part of the vegetable kingdom.

The immense variety of forms and appearances presented by the carbonate of lime, must prevent even the mention of all the names by which they are known.

Geologists have commonly made three general divisions of limestone, founded on its age, or the relative periods in which it was formed, which are called primitive, transitive, and secondary. The first division comprehends nearly the whole of the marbles, most of which are of a granular texture, being composed of grains from the size of fine sand to that of large peas. Lime, like granite, presents the coarsest grains in the oldest specimens. Some deposits of limestone were evidently formed before the adjoining beds of gneiss. In such instances, the lime is coarse, the grains being of the largest size. Such is a deposit in Bolton, Mass. which extends into Boxboro, the adjoining town. A portion of this range is overlaid by gneiss, which circumstance, with some others, leads to the belief that the lime is the oldest.

Nearly all the limestone found in New England belongs to the oldest division. Of this, the longest and largest range is by the borders, or in the direction of the Housatonic river. This range commences at Melford, Ct. within a few miles of the mouth of the river, and extends, with some interruptions, to the northern part of Vermont, and probably into Canada.

In Smithfield, R. I. purely white lime, and of an excellent quality for burning, is in several beds in different parts of the town, from which it is taken in large quantities, and after being burned, goes to market, principally by the way of Providence, and is hence known by the name of Providence lime.

In Stoneham, eight or ten miles from Boston, is a bed of fine white limestone, very nearly resembling the Italian statuary marble. In Thomaston, Me. lime, used both for marble and burning, is found in large quantities. Other beds have been found in Maine,

though they are less known than the deposits already mentioned.

Besides these ranges and beds of primitive limestone, there is found in the western part of New England and the eastern part of New York, a range of transition lime.—This is more compact, and less granular than the primitive rock. In Middlebury, Vt. the transition and secondary rocks alternate, as they do at other places in the same range.

Much the greater part of the lime in the United States comes with the division of the secondary rocks.

Secondary limestone is the most common through the Great Valley of the West.—And except sandstone, it is almost the only rock in several of the western states.

Organic remains, or the impressions of animals or vegetables, are more common in secondary limestone than in any other rock. In some instances, ledges, and even mountains of limestone, appear to be composed almost entirely of the relics of animals, generally some kind, or several kinds of shell fish. Such specimens are called shell lime, or if it is capable of receiving a polish, as some of it is, it is called shell marble.

On some future occasion, we shall explain the interesting process of putrefaction, or the forming of stone from animal and vegetable substances.

From the Percy Anecdotes.

MARRIAGE.

'What a delicious breath marriage sends forth!
The violet's bed's not sweeter. Honest wedlock
Is like a banqueting-house built in a garden,
On which the spring's chaste flowers take delight
To cast their odors.' *Middleton.*

MARRIAGE is a part of the law of the nations, and is known to both civilized and savage states. After the commonwealths of Greece were established, marriage was much encouraged by the laws, and the abstaining from it was discountenanced, and in many places punished. The Lacedemonians were very remarkable for their severity towards those who deferred marriage beyond a limited time, as well as those who wholly abstained from it. The Athenians had an express law that all commanders, orators, and persons entrusted with any public affairs, should be married men.

The time of marriage varied in different places; the Spartans were not permitted to marry, till they arrived at their full strength; the reason assigned for which custom, by Lycurgus, was, that the Spartan children might be strong and vigorous; and the Athenian laws are said to have once ordered, that men should not marry till they were thirty-five years of age.

Most of the Grecian States, especially such as made any figure, required that the citizens should match with none but citizens, and the children were not allowed to marry without the consent of their parents. The usual ceremony in promising fidelity, was kissing each other, or giving their right hands, which was a general form of ratifying all agreements.

So important was the marriage state considered among the Romans, both in a moral and a political view, that they not only rewarded those who married, but decreed penalties against men who remained in a state of celibacy. Fines were first levied on unmarried men about the year of Rome 350; and when pecuniary forfeitures failed to insure their obedience to these connubial edicts, their contumacious neglect of the fair sex was punished by degradation from their tribe. Celibacy continued, however, to gain ground in Rome; and to counteract its effects, we find, that in the year 518 from the foundation of the city, the censors had recourse to the extraordinary measure of obliging all the young unmarried men to pledge themselves on oath to marry within a certain time.

Augustus followed the example of Cæsar and augmented the penalties on bachelors, while he bestowed rewards on those who had a numerous offspring born in wedlock. Marriage also gave numerous advantages to fathers of families; they obtained the preference in all public employments; and if they had not obtained the age required by law, so many years of that period were dispensed with as they had children. Distinguished places were assigned to married men in the public theatres; they had precedence of their unmarried colleagues, and they were exonerated from the discharge of several burdensome public offices. Such were the immunities granted to married men among the Romans until the reign of the Emperor Constantine, who modified them in several points, and abolished the penalties imposed on celibacy.

Among all the savage nations, whether in Asia, Africa, or America, the wife is commonly bought by the husband from the father, or those other relations who have an authority over her; and the conclusion of a bargain for this purpose, together with the payment of the price, has therefore been the usual form of solemnity in the celebration of their marriages.

Notwithstanding the sacredness of the institution, the English law considers marriage in no other light than as a civil contract, its sanctity being left to the ecclesiastical law, to which it belongs to punish or annul unlawful marriages. Pope Innocent III. is said to have been the first to ordain the celebration of marriage in the church, before which it was a totally civil contract. In the time of the grand rebellion in England, all marriages were performed by the justices of the peace; and all these marriages were afterwards declared valid by an act of the 12th of Charles the Second.

SINGULAR ALTERNATIVE

IT was formerly a law in Germany, that a female, condemned to a capital punishment, would be saved if any man would marry her. A young girl at Vienna was on the point of being executed, when her youth and beauty made a great impression upon the heart of one of the spectators, who was a Neapolitan, a middle-aged man, but excessively ugly. Struck with her charms, he determined to save her, and running immediately to the place of execution, declared his intention to marry the girl, and demanded her pardon, according to the custom of the country. The pardon was granted, on condition that the girl was not averse to the match. The Neapolitan then gallantly told the female that he was a gentleman of some property, and that he wished that he was a king, that he might offer her a stronger proof of his attachment. 'Alas! sir,' replied the girl, 'I am fully sensible of your affection and generosity, but I am not mistress over my own heart, and I cannot belie my sentiments. Unfortunately they control my fate; and I prefer the death with which I am threatened, to marrying such an ugly fellow as you are!' The Neapolitan retired in confusion, and the woman directed the executioner to do his office.'

CAOUTCHOUC.

THIS substance, sometimes termed, though improperly, elastic gum, and vulgarly, from its common application to rub out pencil-marks on paper, Indian rubber, is obtained from the milky juice of different plants in hot countries. The principal of these are the Jatropha elastica, and Urceola elastica. To give this substance any particular form, the juice is applied in successive coatings on a mould of clay, and dried by the fire or in the sun; and when of a sufficient thickness, the mould is crushed, and the pieces are shaken out. The most remarkable property of this substance is its elasticity; when warmed, as by immersion in hot water, slips of it may be drawn out to seven or eight times their original length, and will return to their former dimensions nearly. Cold renders it stiff and rigid, but warmth restores its original elasticity. Exposed to the fire, it softens, swells up, and burns with a bright flame. Oil of turpentine softens it, and forms a pasty mass, that may be spread as a varnish, but is very long in drying. A solution of caoutchouc in five times its weight of oil of turpentine, and this solution dissolved in eight times its weight of drying linseed oil, by boiling, is said to form the varnish of air-balloons.

GELATIN.

THIS is an animal substance soluble in water, capable of assuming a well known elastic or tremulous consistence, by cooling, when the water is not too abundant, and liquefiable again by increasing its temperature. This last property distinguishes it from albumen, which becomes consistent by heat. It is precipitated in an insoluble form by tanning; and it is this action of tanning on gelatin that is the foundation of the art of tanning leather.

According to the analysis of M. M. Gay Lussac and Thenard, gelatin is composed of

Carbon . .	47.881
Oxigen . . .	27.207
Hydrogen . .	7.914
Nitrogen . . .	16.998
	100.000

Sugar is composed of oxigen 50.63, carbon 42.47, hydrogen 6.90.

Starch consists of oxigen 49.5, carbon 43.5, hydrogen 7.

Alcohol, of carbon 52.37, oxigen 34.61, hydrogen 13.31.

METEOROLOGY.

WEATHER IN SAVANNAH.

WE are glad again to present the example of the Savannah Female Seminary, as worthy the attention both of teachers and pupils throughout the country. The meteorological table, from the very best source in Savannah, may give some hints which will be useful to other seminaries in keeping similar tables. We are glad to be able to say that several seminaries have already offered to co-operate on the subject of meteorology and of natural history; in the one by keeping tables, and in the other by collecting and exchanging specimens.

We shall esteem it a great favor to make the Lyceum the medium of any communication on a subject so great and so interesting as the co-operating of American schools to advance the objects of American education.

METEOROLOGICAL DIARY FOR THE MONTH OF SEPTEMBER.
Observations taken at 8 A. M.: 2 and 6 P. M.

Days.	Average.	Thermometer.			Wind.	Weather, &c.
1	84	80	87	86	S. W. S. S. W.	Broken Clouds.
2	82	80	83	82	S. S. E. "	Broken Clouds. Distant Thunder.
3	83	80	86	84	N. E. S. E.	Clear. Distant Thunder.
4	85	78	88	87	S. W. " "	Clear. Distant Thunder.
5	86	79	88	90	S. W. S. E. "	Clear. Distant Thunder.
6	85	79	87	88	S. W. S. E. "	Clear. Distant Thunder. A little rain.
7	83	78	86	86	S. W. " S. E.	Clear. Rain in the night.
8	84	80	87	86	S. W. S. E. "	Cloudy. Thunder and rain at night.
9	82	80	84	83	N. E. S. E. "	Cloudy all day.
10	85	80	88	87	S. E. " "	Cloudy. Thunder and rain in the night.
11	84	82	86	85	S. W. S. S. E.	Cloudy. Thunder and rain in the night.
12	82	80	83	83	S. W. " "	Cloudy. Thunder and rain in the night.
13	75	72	78	75	N. " N. E.	Clear and cool.
14	72	66	76	74	N. N. E. "	Clear. Very cool for the season.
15	74	66	84	76	N. E. " "	Clear and cool.
16	75	68	80	76	N. E. " "	Broken Clouds. Cool.
17	81	74	84	84	N. E. " E.	Clear and pleasant.
18	82	75	85	85	N. W. " "	Clear. A heavy shower at night.
19	75	74	82	81	N. W. " "	Broken Clouds. Pleasant.
20	79	73	83	82	N. W. S. E. "	Clear and pleasant.
21	81	74	84	85	N. E " E.	Clear and mild.
22	79	76	81	80	S. W. " "	Clear. Some rain.
23	78	76	80	78	N. E. " "	Cloudy all day.
24	75	75	76	74	N. W. N. E. "	Cloudy. Rain at 5 o'clock.
25	75	70	78	77	N. W. N. N. E.	Broken Clouds. Thunder and rain at night.
26	75	70	78	77	N. E. " "	Broken Clouds. Clear after noon.
27	80	74	80	86	S. W. " S. E.	Broken Clouds.
28	76	74	77	77	N. W. N. N. W.	Cloudy. Rain at night.
29	75	71	77	76	N. W. " S. E.	Clear all day.
30	78	76	80	78	W. " "	Clear. Thunder and rain at 5 o'clock.

REMARKS FOR SEPTEMBER, 1832.

1. These Observations have been taken three times a day, viz: at 8 A M; 2 and 6 P M
2. The mean of the thermometer for the month 77°, 5° colder than the last month. Max. 86° on the 5th. Min. 72° on the 14th.
3. Ther. Ex. at 8 o'clock, A. M. Max. 82° on the 11th. Min. 66° on the 14th and 15th. Mean 75°.
4. Ther. Ex. at 2 o'clock, P. M. Max. 88° on the 4th, 5th and 10th. Min. 76° on the 14th and 24th. Mean. 82°.
5. Ther. Ex. at 6 o'clock, P. M. Max. 90° on the 5th. Min. 74° on the 14th and 24th. Mean 85°.
6. There have been 8 rains, attended with thunder, on the 6th, 7th, 8th, 11th, 12th, 22d, 27th, and 30th; and 4 days showery, on the 10th, 18th, 24th, and 25th. Frequent distant thunder at night.
7. Winds. S. W. and S. 9 days—S. E. and S. 6 days—N. E. and E. 9 days—N. W. and N. 6 days. The weather has been clear 13 days—Broken clouds and showery 17 days.
8. The following primary planets were visible during the month, viz. Mercury was in his inferior conjunction on the 8th, stationary on the 17th, and at his greatest western elongation (17° 52) on the 24th.—Mars appeared in conjunction on the 24th. Pallas was in opposition on the 17th. Ceres was stationary, on the 14th. Jupiter appeared in opposition on the 16th; it could not be observed, being rendered invisible by the superior light of the sun.—Saturn was in conjunction on the 11th; it being cloudy, was not seen.
9. We have had two observations of Biela's comet, during this month—were able to make no discoveries—the tail is barely perceptible. In October it will be in a more favorable position for observation. On the 2d it rose about ten o'clock, P. M.—right ascension 95°, north declination 35° 26″, distant from the earth 66 millions of miles. On the 13th it will rise about 10 o'clock P. M. right ascension 109°, north declination 30° 54″, distant from the earth 57 millions of miles. On the 23d it will rise about 10 o'clock, P. M.—right ascension 111°, north declination 25° 51″ distant from the earth, her nearest approach, about 51 millions of miles. The comet's situation, when it rises, varies a little every day. It will be most brilliant about the middle of November.
10. The health of the city is unusually good. As we have now past the sickly season, we may regard ourselves free from any prevailing epidemic this season—*save the cholera.*

Yours respectfully, W. H. WILLIAMS.

Savannah Female Seminary.

SCHOOL AGENT SOCIETY.

Mr. L. F. Clark, an experienced and skilful teacher, who designs spending a year in travelling in Vermont, will devote a portion of his attention to the objects of the School Agent Society. The friends of schools in that State, are respectfully invited to co-operate with Mr. C. in the great and common cause of education.

Mr. Jewett, Mr. Hall, and several other agents of the society, have already done much in awakening and enlightening public sentiment to its special objects, as well as to the general interests of education. The efforts already made by the society fully prove that by pursuing its objects vigorously and steadily, by the aid of the Lyceums which are or may be formed, a complete intellectual and moral revolution may be effected in our country.

The several agents acting in behalf of the Society, will make it one object to become acquainted with teachers and others who may be disposed and qualified to engage in some way under its patronage. It has frequently been proposed to have a meeting early in the spring, of those who may be disposed to unite in a western enterprise, and prepare to engage in such a way as to strengthen each other's hands, and to secure the patronage, not only of the society and of the friends of education here, but of those in the states and districts they may visit.

To secure the objects of the society entirely, it is important, if not essential, that County Lyceums, or other associations, be organized, to co-operate with the agents in the several places they may visit. By such co-operation, it is evident that the blessings of education may be extended, in a partial degree, at least, to all the children in those counties and districts where it shall take place.

We therefore invite the attention of teachers, and of those who have children to be taught, to the objects of this society, that by their united efforts, the education of our country, and our whole country, may be advanced, as the means to secure the highest prosperity of our republic.

CO-OPERATION OF SCHOOLS.

IT gives us great pleasure to be able to acknowledge the receipt of a box of minerals from the young ladies of the Abbot Female Seminary, Andover, to be forwarded to the Savannah Female Seminary, (Ga.) And it must be gratifying to the young ladies of the latter institution to know, that a correspondence and co-operation is thus solicited, on the part of the young ladies in New-England, in consequence of their gift to the public of a meteorological table, which we had the pleasure of presenting, through the medium of the Family Lyceum. We expect soon to be able to offer other gifts to our readers from similar sources, as they are promised from six or seven States in different sections of the Union.

We are glad to take this opportunity to inform the members of all literary institutions, who may be interested in the subject, that the young ladies of the flourishing institution at Andover, have commenced the collection of a cabinet of natural and artificial productions, for contributions to which, from any sources, they will be grateful.

POWER OF EXAMPLE.

IN the year 1826, a few farmers and mechanics in Millbury, a small village in Massachusetts, organized a society for mutual improvement and the *diffusion of knowledge*, under the name of the 'MILLBURY BRANCH OF THE AMERICAN LYCEUM,' inviting, at the same time, the co-operation of the friends of useful improvement in other parts of the country.

From this humble, but dignified and republican origin, arose the Lyceum system, which has now spread itself through all the States of our Union, into Mexico, South America, Cuba, England, Scotland, France, Spain, and Portugal, and promises to enlighten and bless the whole human family.

ERRATUM.

IN the article under the head of 'Archimedes,' in our last number, the word it, ending a sentence in about the middle of the second paragraph, should be read, *the rest.*

THE ARTS.

From Good's Gallery of Nature and Art.

CALICO PRINTING.

THIS ingenious art consists in dying cloth with certain colours and figures upon a ground of a different hue; the colours, when they will not take hold of the cloth readily, being fixed to them by means of intermedes, or mordants, as they were formerly called, constituting materials that have a chemical affinity or attraction for both the materials that form the colour, and the cloth to which the colour is to be applied. It was long ago supposed that these intermedes corroded their way into the interior of the cloth, and carried the colouring matter along with them, and it was on this account called *mordants;* but since the science of chemistry has been better studied and understood, it has been sufficiently ascertained, that they only act or hold the dye and the cloth together, by a mutual affinity or attraction.

The mordant which is principally used in the general process, is a preparation of alum, called in the new nomenclature acetate of argil. It is prepared by dissolving three pounds of alum and one pound of acetate of lead in eight pounds of warm water. An exchange of the principles of these salts takes place; the sulphuric acid of the alum combines with the oxide of lead, and the compound thus formed being insoluble, is precipitated, the acetic acid remains united with argil of the alum in solution. There are added at the same time two ounces of the potash of commerce, and two ounces of chalk; the principal use of which appears to be, to neutralize the excess of acid that might act on the colouring matter and alter its shade.

The superiority of this acetate of argil as a mordant to the cheaper sulphat of argil or alum, arises principally from two circumstances; from the affinity between its principals being weaker, in consequence of which, the argil more easily separates from the acid, and unites with the cloth and the colouring matter; and 2dly, from the acetic acid disengaged in the process not acting with the same force on the colouring matter as the sulphuric acid would do The acetate being also very soluble, and having little tendency to chrystallize, can be more equally mixed and applied. This discovery of this mordant, so essential in the art of calico-printing, was altogether accidental, or rather empirical. The recipes of the calico-printers were at one time very complicated; different articles were from time to time omitted or changed, until at length the simple mixture of alum and acetate of lead was found to answer as a mordant, equally with compositions more complicated

After the mordants have been applied, the cloth must be completely dried. It is proper for this purpose to employ artificial heat, which will contribute something towards the separation of the acetous acid from its base, and towards its evaporation, by which the mordant will combine in a greater proportion, and more intimately with the cloth.

When the cloth is sufficiently dried, it is to be washed with warm water and cow-dung, till all the flour, or gum, employed to thicken the mordants, and all those parts of the mordants which are uncombined with the cloth, are removed. The cow-dung serves to entangle these loose parts of the mordants, and to prevent them from combining with those parts of the cloth which are to remain white After this, the cloth is thoroughly rinsed in clean water.

Almost the only dye-stuffs employed by calico printers, are indigo, madder, and quercitron bark, or weld. This last substance, however, is but little used by the printers of this country except for delicate, greenish yellows. The quercitron bark has almost superseded it, because it gives colors equally good, and is much cheaper and more convenient, not requiring so great a heat to fix it. Indigo, not requiring any mordant, is commonly applied at once either with a block or a pencil. It is prepared by boiling together indigo and potash made caustic by quick-lime and orpiment; the solution is afterwards thickened with gum It must be carefully secluded from the air, otherwise the indigo would soon be regenerated, which would render the solution useless. Dr. Bancroft has proposed to substitute coarse brown sugar for orpiment: it is equally efficacious in decomposing the indigo, and rendering it soluble; while it likewise serves all the purposes of gum.

Let us now give an example or two of the manner in which the printers give particular colours to calicoes. Some calicoes are only printed of one colour, others have two, others three or more, even to the number of eight, ten, or twelve. The smaller the number of colours, the fewer, in general, are the processes.

1. One of the most common colours on cotton prints is a kind of nankeen yellow, of various shades, down to a deep yellowish brown or drab. It is usually in stripes or spots. To produce it, the printers besmear a block, cut out into the figure of the print, with acetite of iron, thickened with gum or flour; and apply it to the cotton, which, after being dried and cleansed in the usual manner, is plunged into a potash ley. The quantity of acetite of iron is always proportioned to the depth of the shade. 2. For yellow the block is besmeared with acetite of alumina. The cloth, after receiving this mordant, is dyed with quercitron bark, and then bleached. 3. Red is communicated by the same process; only madder is substituted for the bark. 4. The fine light blues, which appear so often on printed cottons, are produced by applying to the cloth a block besmeared with a composition, consisting partly of wax, which covers all those parts of the cloth which are to remain white. The cloth is then dyed in a cold indigo vat; and after it is dry, the wax composition is removed by hot water. 5. Lilac, fleu brown, and blackish brown, are given by means of acetite of iron; the quantity of which is always proportioned to the depth of the shade. For very deep colours, a little sumach is added. The cotton is afterwards dyed in the usual manner with madder, and then bleached. 6. Dove-colour and drab, by acetite of iron and quercitron bark.

When different colours are to appear in the same print, a greater number of operations are necessary. Two or more blocks are employed, upon each of which that part of the print only is cut, which is to be of some particular colour. These are besmeared with different mordants, and applied to the cloth, which is afterwards dyed as usual.

Mr. Henry Maudeslay has a patent press for calico priming; it is described in No. 54, Rep. of Arts, N. S. and No. 7, Retrospect of Discoveries.

In the towns of Manchester, Glasgow, Paisley, &c. many thousands of industrious hands are employed in the manufacture of this article; which according to its different degrees of fineness, is sold from 6d to 6s. and upwards a yard.

Cotton cloth is an intermediate substance between that made of flax and animal wool; but by no means deserves to be commended as a substitute for flannel, next the skin. Calico imbibes and retains the perspired humors, unless it be as frequently changed as linen; while flannel admits a free evaporation through its numerous pores.

From Faraday's Chemical Manipulation.

SILVERING GLASS.

THE advantage of being able to silver a small surface of glass for experiments on light having been experienced, it is assumed that the student may have occasion to perform the same operation: and as regards the manner in which he may coat one side of a glass plate with a bright metallic surface, and thus convert it occasionally into a reflector, he will find no difficulty, by proceeding according to the following directions Having prepared the glass, a piece of clean, smooth tin foil free from holes, is to be cut to the same size, and laid upon a couple of sheets of filtering or blotting paper folded into quarters. A little mercury is to be placed on the foil and rubbed over it with a hare's foot, or with a ball of cotton slightly greased with tallow, until the whole of the upper surface of the leaf be amalgamated and bright. More mercury is then to be added, until the quantity is such as to float over the tin foil. A piece of clean writing paper with smooth edges, is to be laid upon the mercury, and then the glass surface, previously well cleaned, is to be applied to the paper. The paper is to be drawn out from between the mercury and the glass, whilst a slight but steady pressure is to be applied to the latter. As the paper recedes, it carries all air and dirt with it from between the glass and the metal, which come into perfect contact.

The mirror is now made, and may be used for an experiment; but there is still much more mercury present than is required to make the definite and hard amalgam of tin constituting the usual reflecting surface. If it be desired to remove this excess, the newly formed mirror must be put on its edge for some days, when the superabundance of fluid metal will drain to the bottom; or it may be put under the pressure of a flat board, in a slightly inclined position, and loaded with weights.

The mercury used for silvering should be free from other metals; and such as has been used in the manner above described should be kept apart from the rest of the laboratory stock, because of the tin it may contain, or, before being added to it, should be purified by some of the methods described.

MAN.

From the Young Man's Book of Knowledge.

HIS MOTIONS.

PART of the motions of the complicated frame of man, in common with all animated beings, are *voluntary*, or dependent on the mind; and part *involuntary*, or without the mind's direction.

How the incorporeal existence, which we call *mind*, can operate on matter, and put it in motion, is to us perfectly incomprehensible When the anatomist considers the number of muscles that must be put in motion before any animal exertion can be effected; when he views them one by one, and tries to ascertain the precise degree to which every individual muscle must be constricted or relaxed, before the particular motion indicated can be effected, he finds himself lost in the labyrinth of calculations in which this involves him: but when he considers that every one of these muscles must be constricted or relaxed to the precise degree that appertains to each, and no more, and at the same instant of time; when he recollects that the smallest jarring in this respect in any one of these, would throw the whole into inextricable disorder: when he considers with what promptitude the whole of this is done in an instant by the mere act of his volition, and how, in another instant, by a change in that volition, all these muscles are thrown into a different state, and a new set brought into action, and so on continually as long as he pleases, his mind is lost in the immensity of wonder that this excites. But when he farther reflects, that it is not only he himself that is endowed with the faculty of calling forth those incomprehensible energies, but that the most insignificant insect is vested with powers of a similar sort, he is still more confounded. A skillful naturalist has been able to perceive, that in the body of the poorest catterpillar, which, in the common opinion, is one of the most degraded existences on this globe, there are upwards of two thousand muscles, all of which can be brought into action with as much facility at the will of that insect, and perform their several offices with as much accuracy, promptitude, and precision, as in the most perfect animal; and all this is done by that insect with an equal consciousness of the manner how, as the similar voluntary actions of man are affected.

Nor are the involuntary motions less mysterious and wonderful. The stomach, the intestines, and all the functions necessary to life, wait not to be called into action by any volition of ours. The heart, placed near the centre of the system, performs its task as well when we are asleep as when we are awake, by night as by day, and like an unwearied and faithful laborer, with muscular exertions, distributes the vital stream through our complicated frame, till their wearied functions cease, and the tenement of clay is inhabited no more. How admirably it is calculated to keep up this continued circulation throughout the system, may be understood by the following computation, by Dr. Keill: Each ventricle will at least contain one ounce of blood The heart contracts four thousand times in one hour; from which it follows, that there pass through the heart every hour, four thousand ounces, or three hundred and fifty pounds of blood. Now the whole mass of blood is said to be about twenty-five pounds; so that a quantity of blood equal to the whole mass of blood passes through the heart fourteen times in one hour, which is about once every four minutes. Consider what an affair this is when we come to very large animals. The aorta of a whale is larger in the bore than the main pipe of the water works at London Bridge; and the water roaring in its passage through that pipe, is inferior in impetus and velocity to the blood gushing from the whale's heart. Hear Dr. Hunter's account of the dissection of a whale. 'The aorta measured a foot diameter. Ten or fifteen gallons of blood is thrown out of the heart at a stroke, with an immense velocity, through a tube of a foot diameter. The whole idea fills the mind with wonder.' It is thus, O great Author of all things! that we discover Thee in thy works.

From Mitchell's Cyclopædia.

HERALDRY.

THIS is a science which teaches how to blazon, or explain in proper terms, all that belongs to coats of arms; and how to marshall or dispose regularly divers arms on a field.

Arms, or coats of arms, are hereditary marks of honor, made up of fixed and determined colors and figures, granted by sovereign princes, as a reward for military valor, or some signal public service performed. These are intended to denote the descent and alliance of the bearer, or to distinguish states, cities, societies, &c. civil, ecclesiastical, and military.

Men, in all ages, have made use of figures of living creatures, or symbolical signs, to denote the bravery and courage either of their chief or nation, to render themselves the more terrible to their enemies, and even to distinguish themselves or families, as names do individuals.

MAGNET.

THE natural magnet, or loadstone, is a hard mineral body of a dark brown, or almost black color, and when examined, is found to be an ore of iron. It is met with in various countries, generally in iron mines, and of all sizes and forms.

It is not precisely known when and by whom the directive property of the magnet was discovered. The most probable account seem to prove, that it was known early in the 13th century; and that the person who first made mariners' compasses, at least in Europe, was a Neapolitan, of the name of Flavio, or John de Gioga, or Giova, or Gira.

The natural loadstone has also the quality of communicating its properties to iron and steel; and when pieces of steel properly prepared are touched, as it is called, by the loadstone, they are denominated artificial magnets.

These artificial magnets are even capable of being made more powerful than the natural ones; and as they can be made of any form, and are more convenient, they are now universally used, so that the loadstone or natural magnet is only kept as a curiosity.

IVORY

Is the tusk or tooth of defence of the male elephant. It is an intermediate substance between bone and horn, not capable of being softened by fire, nor altogether so hard and brittle as bone. Sometimes it grows to an enormous size, so as to weigh near two hundred pounds. The entire tooth is of a yellowish, brownish, and sometimes a dark brown colour on the outside, internally white, hollow towards the root, and so far as was inserted into the jaw, of a blackish brown color. The finest, whitest, smoothest, and most compact ivory comes from the island of Ceylon. The grand consumption of this commodity is for making ornamental utensils, mathematical instruments, cases, boxes, balls, combs, dice, and an infinity of toys. The workmen have methods also of tinging it to a variety of colors.

The coal of ivory is used in the arts under the denomination of ivory black. Particular vessels are used in the manufacture of this pigment, for the purpose of rendering it perfectly black.—Some travellers speak of the tooth of the sea-horse as an excellent ivory; but it is too hard to be sawed or wrought like ivory.

MANNA.

Several vegetables afford manna; but the ash, the larch, and the alhagi afford it in the largest quantities. The ash, which affords manna, grows naturally in all temperate climates; but Calabria and Sicily appear to be the most natural countries to this tree. The manna flows naturally from the tree, and attaches itself to its sides in the form of white transparent drops; but the extraction of this juice is facilitated by incisions made in the tree during summer. Its smell is strong, and its taste sweetish and slightly nauseous; if exposed on hot coals, it swells up, takes fire, and leaves a light bulky coal. Water totally dissolves it, whether hot or cold. If it be boiled with lime, clarified with white of egg, and concentrated by evaporation, it affords chrystals of sugar. Manna affords, by distillation, water, acid, oil, and ammonia; its coal affords fixed alkali. This substance forms the basis of many purgative medicines.

QUESTIONS ON LYCEUM No. 11.

What places of antiquity contained the most noted labyrinths, and which of those were the largest?

What historian gives us an account of the Egyptian labyrinths?

What is the length of the Chinese wall?

What species of rock was used in constructing this wall?

How long before the christian era was this wall constructed?

Who among the moderns has proved by experiments, that the accounts respecting the burning mirrors and other instruments ascribed to Archimedes, might be true?

What are some of the powers which man possesses in common with the brutes?

What powers and faculties elevate him above all other creatures upon the earth?

What two general divisions of the frame or physical structure of man?

What are some of the solid parts of his body? also the fluid?

What is the use of the nerves in the animal system?

What are the muscles and tendons, and what purposes do they answer?

What are those parts of the human form called which connect the bones at the joints?

Where are the cartilages, and what are their uses?

What are the blood vessels, and in what part of the body do they exist?

For what purposes can farmers use Lyceums?

What substances might Lyceums collect, which would be useful to farmers?

What sciences are most useful for farmers?

In what instruments are wheels and pinions used?

Of what simple instrument already described are the wheel and pinion a modification?

If in a wheel and axle, the wheel be a hundred inches, and the axle ten inches in circumference, what weight on the axle will one ounce on the wheel balance?

From what town in Egypt did the Romans procure stone for building their city?

What is the name of this stone, and of what ingredients is it composed?

From what town in the vicinity of Boston is the same kind of stone procured?

Of what ingredients is greenstone composed?

In what places in New-England are large deposits of greenstone?

What is the stone called which composes the Giant's Causeway?

In what town in New-England is there a large deposit of the sulphuret of iron, and to what use is it applied?

What is the chemical name of copperas, and of how many ingredients is it composed?

By what process is the sulphuret of iron changed into the sulphate of iron, in the manufacture of copperas?

By what animals are pearls produced?

At what place is the pearl fishery carried on extensively, and by whom?

What is the mother of pearl?

Are any substances called pearls which are not the production of the pearl oyster?

In what part of the animal system is the gastric juice deposited, and what is its use?

In what places at the south are flourishing Female Seminaries?

On what subjects might female and other seminaries, in different parts of the United States, co-operate?

What would be some of the advantages arising from a box of specimens of Natural History being sent from a school in Massachusetts to a school in Georgia?

What chapter in the Bible is remarkable for its comprehensive and sound philosophy?

What are some of the advantages mentioned by Wedgwood, as arising from the manufacture of porcelain and other potteries?

At what other places in England besides Staffordshire, already mentioned, is porcelain made?

What two remarkable specimens were made in Yorkshire?

When and by whom was the first engraving on wood done in Europe?

What number of volumes are the public libraries in Europe said to contain?

Which is the largest library in Europe, and how many volumes does it contain?

How many libraries contain over 400,000 volumes, and where are they?

In which country do the public libraries contain the largest number of books, France or Germany?

What number do those of Italy contain?

How many volumns are there in the British Museum, London?

How many in the whole of Great Britain?

How many in the library at Gottingen?

What number in the Russian Empire?